5.17 WORKER SAFETY

This section addresses safety and health issues and describes or outlines systems and procedures that will be implemented to provide occupational safety and health protection for workers on the Project, including generating facility and its ancillary systems workers. These systems and procedures will be implemented in accordance with all applicable worker health and safety laws, ordinances, regulations, and standards (LORS). All applicable elements of the Title 8 California Code of Regulations (8 CCR), General Industry Safety Orders, Construction Safety Orders, and Electrical Safety Orders, are addressed below. Section 5.17.1, Affected Environment, describes the affected environment relative to worker health and safety. An outline of the principal components of the health and safety programs to be implemented during construction and operation is presented in Section 5.17.2, Environmental Consequences. Mitigation measures are discussed in Section 5.17.3, Mitigation Measures. Section 5.17.4, Compliance with LORS, addresses compliance with LORS.

5.17.1 Affected Environment

The Project includes the construction, operation, maintenance, and abandonment of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (Phase I: 500MW [approximately 5,838 acres]/Phase II 350MW [approximately 2,392 acres]). The Project will consist of up to approximately 34,000 SunCatchers. Construction is anticipated to occur over an approximate four-year period beginning in 2010 and ending in 2014. It is estimated that approximately an average of 400 construction and 180 long-term labor jobs will be required.

The Project is located in an undeveloped area of San Bernardino County, California approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) between approximately 1,925 to 3,050 feet above mean sea level. The Project is located primarily on Bureau of Land Management (BLM) land within the Barstow Field Office. Approval of the Project Right-of-Way (ROW) Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert. The Cady Mountain Wilderness Study Area (WSA) is located north of the Solar One site. The Pisgah Crater, within the BLM-designated Pisgah Areas of Critical Environmental Concern (ACEC), is located south and east of the Project (south of I-40 by several miles). Several underground and above ground utilities traverse the area.

An approved interconnection letter from California Independent Service Operator (CAISO) has been issued for the Project. The associated System Impact Study (SIS) is located in Appendix H. The SIS indicates that additional upgrades to the Southern California Edison (SCE) Lugo-Pisgah No. 2 Transmission Line and upgrades at the SCE Pisgah Substation will be required for the full build out of the 850MW Project. Supplemental studies performed by SCE and CAISO indicate that capacity is available on the existing transmission system to accommodate less than the 850MW Project.

An on-site substation (i.e., Solar One Substation [approximately 3 acres]) will be constructed to deliver the electrical power generated by the Project to the SCE Pisgah Substation. Approximately twelve to fifteen 220kV transmission line structures (90 to 110 feet tall) would be required to make the interconnection from the Solar One Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project Site.

The Project will include a centrally located Main Services Complex (14.4 acres) that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank.

Adjacent to the Main Services Complex, a 14-acre temporary construction laydown area will be developed and an approximately 6-acre construction laydown area will be provided adjacent to the Satellite Services Complex south of the Burlington Northern Santa Fe (BNSF) railroad. Two additional construction laydown areas (26 acres each) one will be located at the south entrance off Hector Road and the other at the east entrance just north of the SCE Pisgah Substation.

Temporary construction site access would be provided off of I-40 beginning east of the SCE Pisgah Substation and would traverse approximately 3.5 miles across the Pisgah ACEC requiring an approximate 30-foot ROW. Long-term permanent access would be provided by a bridge over the BSNF railroad along Hector Road north of I-40. Equipment may be transported during construction via trucks and/or rail car (through the construction of a siding), that would be located on the north side of BNSF railroad and east of Hector Road or as authorized by BNSF.

Water would be provided via a groundwater well located on a portion of the BLM ROW north of the Main Services Complex and transported through an underground pipeline. The expected average well water consumption for the Project during construction is approximately 50 acre-feet per year. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities.

5.17.2 Environmental Consequences

Construction, operation, and maintenance activities may expose workers to the hazards identified in Table 5.17-1, Potential Worker Hazards During Project Construction and Table 15.7-3, Potential Worker Hazards During Facility Operation and Maintenance. Exposure to these hazards can be minimized through adherence to appropriate engineering design criteria and administrative controls, use of applicable personal protective equipment (PPE), and compliance with all applicable health and safety LORS. The programs, regulations, and preventive measures intended to control the potential worker health and safety effects associated with these hazards are described throughout this section. This section describes a comprehensive health, safety, and fire prevention program and an accident/injury prevention program intended to ensure healthful and safe operations at the Project Site.

5.17.2.1 Construction Health and Safety Program

To protect the health and safety of workers during construction, the Applicant (or construction contractor) will ensure compliance with the Construction Health and Safety Program, and all federal, state, and local health standards that pertain to worker health and safety.

Table 5.17-1
Potential Worker Hazards During
Facility Construction

ACTIVITY	POTENTIAL HAZARD
Elevated Work	Slips/trips/falls.
Hot Work - Welding/Cutting	Flash burns, explosion, thermal burns, toxic welding fumes.
Excavations	Excavation/trench wall collapse, spoil movement, oxygen deficiency, buildup of toxic, gases, fumes, vapors, dusts or mists, wet exposures, crushing hazards, confined spaces, potentially contaminated soil/waste.
Cement/Forms Work	Slips/trips/falls, protruding objects, caustics, punctures, and lacerations.
Equipment Operation- Motor Vehicle and Heavy Equipment Use	Noise exposure, vehicle accidents, load hazards, induced current.
Transmission Lines/ Transformer Station- Working on Electrical Equipment and Systems	Slips/trips/falls, contact with live electricity and energized equipment, electrocution, flash burns.
Painting	Paint solvents, paint vapors, chemical burns, fire/explosion, and slips/trips/falls.
Abrasive Blasting	Dust, flying particles, pressure vessels, noise.
Powered Hand Tools	Noise, dust, flying particles, cuts, amputation, crushing.
Fueling and Working with Flammable and Combustible Liquids	Fire, explosion, spills, environmental contamination.
Construction and Testing of High-Pressure Steam and Air Systems	Injury from failure of pressurized system components or unexpected pressure release
General Construction Activities	Heat and cold stress, biological hazards, noise exposure, dust exposure, injury to head, eyes,/face, body, foot, and skin, ergonomic injuries, exposure to hazardous materials

Source: California Department of Industrial Relations (2008).

Construction Injury and Illness Prevention Program

The Construction Health and Safety Program will meet the California Occupational Safety and Health Administration (Cal-OSHA) Injury and Illness Prevention (IIPP) requirements. The IIPP will include:

- a written Code of Safe Practices that relates to construction activities,
- identification of the person or persons responsible for implementing the program,
- posting of the Code of Safe Practices at a conspicuous location at each job site office or providing it to each supervisor, who shall have it readily available,
- a system for identifying workplace hazards, including inspections,

- a system of ensuring employee and subcontractor compliance,
- "toolbox" or "tailgate" meetings conducted by supervisors with employees to discuss job hazards and mitigation measures,
- methods of communicating with employees that encourage employees to expose unsafe activities, and
- procedures for correcting unsafe conditions.

When workers are first employed, they will be given instruction regarding the hazards and safety precautions applicable to the type of work in question; workers will also be directed to read the Code of Safe Practices. When employees are required to work near known job site hazards, they will be instructed in the recognition of the hazard, the procedures for protecting themselves from injury, and the first aid procedures in the event of injury.

Construction Written Health and Safety Programs

Written safety programs that will be implemented in conjunction with the Code of Safe Practices may include the following:

- accident/incident reporting procedures,
- Blood-borne Pathogens Exposure Control Program,
- compressed gas and air handling systems,
- confined space entry procedures,
- Contractor Safety Program,
- electrical safety procedures,
- Emergency Action Plan,
- emergency response procedures,
- Excavation, Trenching, and Shoring Program,
- Fall Protection Program,
- Fire Protection and Prevention Plan,
- hand tools and equipment guarding safety procedures,
- Hazard Communication Plan (including Proposition 65 requirements),
- hazardous materials handling procedures,
- hazardous waste awareness training,
- Hearing Conservation Program,
- heat stress/cold stress prevention,
- heavy equipment procedures,
- hoist/chain/wire rope/webs/rope slings/crane procedures,

- Hot Work Program (welding, cutting, and brazing),
- Industrial Hygiene Program,
- industrial truck (forklifts) safety,
- ladders, scaffolds, and work platforms,
- lockout/tag-out procedure,
- motor vehicle safety,
- PPE Program,
- portable electric and pneumatic tools,
- preventing slips, trips, and falls,
- repetitive stress injuries/ergonomics/lifting hazards,
- Respiratory Protection Program,
- Safety and Housekeeping Inspection Program,
- Safety Committee and toolbox/tailgate safety meetings,
- Security Program,
- signs, tags, and barricades, and
- tools, power- and hand-operated.

Construction Personal Protective Equipment Program

Employees will be instructed to use the required PPE during construction activities. Required PPE will be approved for use, distinctly marked to facilitate identification, and be used in accordance with the manufacturer's instructions. The PPE will be of such design, fit, and durability as to provide adequate protection against the hazards for which it is designed. The type of PPE required for each job task will be described in the job safety analysis for that task. The use of PPE for site activities includes, but is not limited to, the items specifically described in Table 5.17-2, Basic Protective Equipment Guide, and will comply with Cal-OSHA requirements. When protective insulating equipment is used, it will comply with the Electrical Safety Codes.

Table 5.17-2
Basic Protective Equipment Guide

Body Area	Hazards	Recommended Protection
Eyes/face	Low-velocity flying particles.	Safety glasses with side shields.
	High-velocity chips and sparks.	Impact goggles or safety glasses with full face shield.
	Corrosive liquid splash during transfer.	Splash proof goggles and face shield.
	Welding – injurious light rays.	Welding hood with appropriate eye filter lenses.

Table 5.17-2
Basic Protective Equipment Guide

Body Area	Hazards	Recommended Protection
Head/ears	General wear, overhead rigging, material handling, maintenance, and general construction processes.	Hardhat.
	High noise level.	Earplugs or muff.
Respiratory system	Low-hazard inert dusts.	Dust mask.
	Low concentration solvent vapors.	Cartridge-type organic vapor respirator.
	Acid mists.	Cartridge-type acid mist respirator.
	High-concentration dusts or vapors.	Airline respirator.
	Oxygen deficiencies or gases.	Self-contained breathing apparatus.
Hands and arms	Handling rough or sharp objects.	Leather gloves.
	Handling hot objects.	Insulated gloves.
	Using solvents.	Impervious synthetic gloves.
Feet and legs	General wear for light handling. Handling heavy objects.	Safety-toe shoes Metatarsal safety shoes.
	Working with corrosive liquids.	Safety-toe boots.
	Underground work.	Safety-toe synthetic boots.
Trunk and full body	Hot or corrosive liquids.	Synthetic apron.
	Punctures, impact, or cuts.	Canvas or leather kickback apron or metal mesh apron.
	Breaking acid containers.	Full body suit made of appropriate materials.
Fall protection/rescue	Working from elevated structure or platform without standard railings.	Safety belt and lanyard.
	Vessel entry.	Harness and lifeline or wristlets and lifeline.
	Suspended scaffolds.	Lifeline, safety belt/lanyard.

Source: California Department of Industrial Relations, 2008.

A respiratory protection program complying with 8 CCR 5144 and General Industry Safety Order requirements will be developed, including respirator training, fit testing, monitoring, selection, etc.

Fire Protection and Prevention Plan

The Solar One Project will rely on both on-site fire protection systems and local fire protection services. A Fire Protection and Prevention Plan will be developed and followed throughout Project construction. The specified firefighting equipment will be provided to site personnel. During construction, the permanent Project fire protection system will be placed in service as early as practicable. An interim fire protection system will be in place during construction until the permanent system is completed. The fire protection systems for the Solar One Project Site are described in Section 3.0, Project Description and Location. Construction fire regulations in 8 CCR 1620 *et seq.* will be followed as necessary to prevent construction fires. Applicable local fire requirements include:

- 1998 edition of California Fire Code and all applicable National Fire Protection Association (NFPA) standards (24 CCR Part 9),
- Uniform Fire Code standards, and
- California Building Code 24 CCR 3 *et seq*.

Special attention will be paid to operations involving open flames, such as welding, and use of flammable materials. Personnel involved in such operations will have appropriate training. A fire watch utilizing appropriately classed extinguishers or other equipment will be maintained during hot work operations. Site personnel will not be expected to fight fires past the incident stage. The local responding fire officials will be given information on the site hazards and the location of these hazards, and the information will be included in the emergency response planning.

Materials brought on-site must conform to contract requirements, insofar as flame resistance or fireproof characteristics are concerned. Specific materials in this category include fuels, paints, solvents, plastic materials, lumber, paper, boxes, and crating materials. Specific attention will be given to storage of compressed gas, fuels, solvents, and paint. Electrical wiring and equipment located in inside storage rooms used for Class I liquids will be stored in accordance with applicable regulations. Outside storage areas will be graded to divert possible spills away from buildings and will be kept clear of vegetation and other combustible materials. Precautions will be taken to protect storage areas against tampering where necessary.

On-site fire prevention during construction will consist of portable and fixed firefighting equipment. Portable firefighting equipment will consist of fire extinguishers and small hose lines in conformance with Cal-OSHA and the NFPA for the potential types of fire from construction activities. Periodic fire prevention inspections will be conducted by the contractor's safety representative.

Fire extinguishers will be inspected routinely and replaced immediately if defective or in need of recharge. All firefighting equipment will be conspicuously located and marked with unobstructed access. A water supply of sufficient volume, duration, or pressure to operate the required firefighting equipment will be provided on-site. Authorized storage areas and containers for flammable materials shall be used with adequate fire control services.

5.17.2.2 Project Operational Safety

The locations of potential worker hazards during Project operations are listed in Table 5.17-3, Potential Worker Hazards during Facility Operation and Maintenance at the Solar One Project Site.

Table 5.17-3
Potential Worker Hazards during
Facility Operation and Maintenance

Activity	Potential Hazard
Generation Enclosure	High voltage.
Operations Building	High voltage, repetitive trauma.
Transformer	Electrocution, flash burns.

Table 5.17-3
Potential Worker Hazards during
Facility Operation and Maintenance

Activity	Potential Hazard
Compressor	Fire, noise, temperature, rotating equipment, pressure.
Chemical Storage	Chemical splashes, burns, reactions, gases, vapors, fumes, injury due to ingestion, inhalation, or dermal contact.
Machinery, General	Noise, temperature extremes, rotating equipment, electrocution.
Elevated Work	Slips/trips/falls.
Hot Work - Welding/Cutting	Flash burns, explosion, thermal burns, toxic welding fumes.
Equipment Operation-Motor Vehicle and Heavy Equipment Use	Noise exposure, vehicle accidents, load hazards, induced current.
Fueling and Working with Flammable and Combustible Liquids	Fire, explosion, spills, environmental contamination.
Transmission Lines/ Transformer Station-Working on Electrical Equipment and Systems	Slips/trips/falls, contact with live electricity and energized equipment, electrocution, flash burns.
Maintenance of High-Pressure Steam and Air Systems	Injury from failure of pressurized system components or unexpected pressure release.
General Plant Operation Activities	Heat and cold stress; biological hazards; noise exposure; dust exposure; injury to head, eyes,/face, body, foot, and skin; ergonomic injuries; and exposure to hazardous materials.

Source: California Department of Industrial Relations (2008).

Programs that address these hazards will include:

- regular employee education and training in safe work practices for general and particular task areas,
- communication of hazards in accordance with federal and state standards,
- accident and incident evaluations,
- administrative safety procedures,
- emergency response,
- fire prevention and fire response,
- security, and
- maintenance of safety performance data.

All operations personnel will be provided with written safety guidance. All construction safety programs and procedures that apply to Project operations will be incorporated into the Project operational safety program.

Operations Injury and Illness Prevention Program

The primary mitigation measures for worker hazards during Project operations are contained in the IIPP, which is required by 8 CCR 3203. The written IIPP contains the following information:

- identity of the person(s) with authority and responsibility for implementing the program,
- a system for ensuring that employees comply with safe and healthy work practices,
- a system for communicating with employees in a readily understandable form,
- procedures for identifying and evaluating workplace hazards, including inspections to identify hazards and unsafe conditions,
- methods for correcting unhealthy/unsafe conditions in a timely manner—when the hazard is discovered and/or when there is an imminent danger,
- a training program for:
  - establishing the program initially
  - new, transferred, or promoted employees
  - new processes and equipment
  - supervisors,
- methods of documenting inspections and training and maintaining records for 3 years, and
- providing all operations personnel with written safety guidance.

The IIPP designates a safety representative, who is responsible for implementing the program. The IIPP also describes safety training for new employees and procedures for tracking safety training. In addition, the IIPP provides Job Hazard Analyses (JHAs) for each job. The JHA will identify safety hazards related to each work task and establish procedures for avoiding, correcting, reporting, and notifying employees of these hazards.

Operational Written Safety Programs

The IIPP is used in conjunction with other written safety programs. These programs may include the following:

- accident/incident reporting procedures,
- Chemical Hygiene Plan,
- Code of Safe Practices for Equipment and Operation,
- compressed gas and air handling systems,
- confined space entry procedures,

- electrical safety procedures,
- Emergency Action Plan,
- emergency response procedures,
- Fall Protection Program,
- Fire Protection and Prevention Plan,
- hand tools and equipment guarding safety procedures,
- Hazard Communication Plan (including Proposition 65 requirements),
- hazardous materials handling procedures,
- hazardous waste awareness training,
- Hearing Conservation Program,
- heat stress/cold stress prevention,
- heavy equipment procedures,
- hoist/chain/wire rope/webs/rope slings/cranes,
- Hot Work Program (welding, cutting, and brazing),
- Industrial Hygiene Program,
- Industrial truck (forklifts) safety,
- ladders, scaffolds, and work platforms,
- lock out/tag out procedure,
- motor vehicle safety,
- PPE Program,
- portable electric and pneumatic tools,
- preventing slips, trips, and falls,
- repetitive stress injuries/ergonomics/lifting hazards,
- Respiratory Protection Program,
- Safety and Housekeeping Inspection Program,
- Safety Committee and toolbox/tailgate safety meetings,
- Security Program,
- stop work authority,
- signs, tags, and barricades, and
- tools, power- and hand-operated.

These programs and procedures will be reviewed annually to determine if they are affected by any new regulations and to determine the effectiveness of their implementation. Other written programs or plans may relate to worker safety in that they enable work to be performed in a safe manner. These include standard operating procedures, worker qualifications programs, and site security.

Operational Safety Training Programs

All Solar One Project workers will be given instructions regarding their responsibility for the safe conduct of their work. These instructions will be given in part at the time the employee is first hired and as an ongoing training program of hazard recognition and avoidance.

Workers will be instructed in the safety regulations pertinent to their employment tasks. Safe working conditions, work practices, and protective equipment requirements will be communicated in the following manner.

- New, promoted, or transferred employees receive safety training orientation.
- Weekly safety meetings are held with employees.
- Toolbox/tailgate safety meetings are conducted periodically for each crew. General safety topics and specific hazards that may be encountered will be discussed. Comments and suggestions from all employees will be encouraged.
- A regularly scheduled safety meeting will be held for supervisors.
- Hazard communication training, including California Proposition 65 warnings and discharge prohibitions, will be conducted as new hazardous materials are introduced to the workplace.
- Material Safety Data Sheets will be provided for all appropriate chemicals.
- A bulletin board with required postings and other information will be maintained at the Project Site.
- Warning signs will be posted in hazardous areas.

Safety training will be provided to each new employee as described below.

- A list of safe work rules for the Solar One Project will be explained to each new employee.
- A copy of the applicable Safe Work Practices will be given to each new employee. The provisions will be incorporated into training for the qualifications programs so that employees may fully understand what the protective provisions mean.
- The Hazard Communication Program and other applicable training and requirements for personal protection for the types of hazards that may be encountered at the Solar One Project Site will be explained to employees. This training will be documented.
- Unusual hazards that are found on-site will be explained in detail to each new employee, including any specific requirements for personal protection.
- Safety requirements for the new employee's specific job assignment will be explained by the foreman on initial assignment and on any reassignment.

Operational Personal Protective Equipment Program

Personal protective clothing and equipment will be used during specified work operations. Each employee will be provided the following information pertaining to the protective clothing and equipment:

- proper use and maintenance of the protective clothing and equipment,
- when the protective clothing and equipment are to be used,
- the benefits and limitations of the protective clothing and equipment,
- when and how the protective clothing and equipment are to be replaced, and
- check of each employee for proper fit and to see if they are medically capable of wearing the equipment.

All safety equipment will meet National Institute for Occupational Safety and Health or American National Standards Institute standards and will have all required markings, numbers, or certificates of approval. Table 5.17-2, Basic Protective Equipment Guide, contains a list of the basic protective equipment that will be used during operation at the Solar One Project.

Hazardous Materials Handling and Storage

Various hazardous materials will be stored and used during construction and operation of the Solar One Project. The storage, handling, and use of all hazardous materials will follow applicable LORS to minimize risks to workers. All hazardous materials will be appropriately labeled and stored in hazardous materials storage facilities. Bulk hazardous materials will be stored in aboveground storage tanks. Other hazardous materials will be stored in their delivery containers. Hazardous materials storage and chemical feed areas will be surrounded by containment or curbing to contain leaks and spills. The containment areas will be sized to hold an appropriate volume (considering the potential for local hazard contingencies), as designated by a California-registered Professional Engineer. At a minimum, this volume equals the full contents of the largest single tank plus sufficient capacity for precipitation from a 25-year, 24-hour storm event in the case of outdoor storage tanks.

Safety showers and eyewash stations will be provided in or adjacent to corrosive chemical storage areas and in required areas in accordance with regulatory requirements. The PPE and spill response equipment for the exposure and cleanup will be readily available for Project personnel to use during spill containment and cleanup activities. A hazardous material emergency response team that is trained in the handling of these emergencies and accidental releases of hazardous materials will be available to the Solar One Project through contract. Emergency contact numbers will be available for spill response contractors and for notification to local agencies of spill incidents. These and other procedures will be detailed in the Solar One Project Emergency Action Plan.

A Risk Management Plan (RMP) will be developed for the storage and use of hydrogen on the Project Site. The RMP will detail specific safety requirements, procedures, and training to protect workers from a release or explosion of hydrogen.

Operational Emergency Action Plan/Emergency Response Plan

In addition to incorporating various safety and environmental features and design measures to minimize emergencies and their effects on public and worker safety, the Solar One Project will develop a site-specific Emergency Action Plan/Emergency Response Plan. A typical plan outline is provided in Table 5.17-4, Sample Emergency Action/Emergency Response Plan Outline. The Emergency Action Plan/Emergency Response Plan is designed to address potential emergencies, including hazardous materials releases, fires, bomb threats, pressure vessel ruptures, and other catastrophic events. This plan describes evacuation routes, warning devices, points of contact, assembly areas, responsibilities, and other actions to be taken in the event of an emergency. The plan has a layout map and a fire extinguisher list, and describes arrangements with local emergency response agencies for responding to emergencies.

Table 5.17-4
Sample Emergency Action/Emergency Response Plan Outline

Section Number	Description
1.0	**Introduction**
1.1	Purpose
1.2	Scope
2.0	**Responsibilities**
2.1	Incident Command System
	Emergency Response Coordinator
	Emergency Evacuation Coordinator
	Alternate Safety Coordinator
2.2	Position Description Assignments
	Project Manager
	Project Supervisor
	Operators
	Health and Safety Manager
	Security
3.0	**Response and Notification Plan (Points of Contact)**
3.1	Supervisor/Emergency Coordinator
3.2	Health and Safety Manager
4.0	**Response Procedures**
4.1	Evacuation Routes and Procedures
4.2	Accidents Involving Serious Injury and/or Death
4.3	Fire
4.4	Hazardous Waste or Chemical Spills
4.5	Earthquake
4.6	Bomb Threat
4.7	Emergency Project Shutdown
4.8	Site Security
4.9	Emergency Medical Treatment and First Aid
4.10	Decontamination

Table 5.17-4
Sample Emergency Action/Emergency Response Plan Outline

Section Number	Description
4.11	Documentation and Recordkeeping
4.12	News Media
4.13	Emergency Notification List
4.14	Emergency Telephone Numbers List
5.0	**Reference Procedures**
5.1	Evacuation Plan
5.2	Emergency Equipment Locations
5.3	Fire Extinguisher Locations
5.4	Security
5.5	Accident Reporting and Investigation
5.6	Lockout/Tagout
5.7	Hazard Communication
5.8	Spill Containment and Reporting
5.9	First Aid and Medical Response
5.10	Respiratory Protection
5.11	Personal Protective Equipment
5.12	Sanitation
5.13	Work Site Inspections

Source: California Department of Industrial Relations, 2008.

Emergency services will be coordinated with the nearby fire department of Newberry Springs, California, and a hospital in Barstow, California. An off-site medical clinic will be contracted to set up nonemergency physician referrals. First aid kits and fire extinguishers will be provided around the site and in offices, and will be regularly inspected and maintained by qualified personnel. Safety personnel trained in first aid will be part of the construction staff. As this is a remote site, an Emergency Medical Technician (EMT) or other highly trained medical professional will be assigned to the site to provide advanced injury care. In addition, all foremen and supervisors will be given first aid training.

Fire Protection and Prevention Plan

Fire protection at the Solar One Project Site will include measures relating to safeguarding human life, preventing personnel injury, preserving property, and minimizing downtime due to fire or explosion (National Safety Council 1992). Fire protection also involves physical arrangements, such as sprinkler systems, water supplies, and fire extinguishers. Fire protection measures include fire prevention measures to prevent the inception of fires. Topics of concern include adequate exits, fire-safe construction, reduction of ignition sources, and control of fuel sources.

The Fire Protection and Prevention Plan provides for fire protection practices, including routine inspections of the Solar One Project Site by the designated safety representative. The plan requires prompt action to correct situations deemed to be a fire hazard, and it identifies

firefighting equipment and systems at the Project Site as well as methods to safely store flammable and combustible materials. Project facilities have been designed by a California-registered Fire Protection Engineer and fire protection equipment is installed and maintained in accordance with all applicable NFPA standards and recommendations (NFPA 1994). A fire reporting protocol (depending on the size of the fire) and an investigation protocol are detailed in the Fire Protection and Prevention Plan.

The comprehensive on-site fire protection system and procedures will be designed and implemented to protect both personnel and property. A Program Fire Protection Station Order will be developed to address the following:

- names and/or job titles responsible for maintaining equipment and accumulation of flammable or combustible material control,
- procedures in the event of fire,
- fire alarm and protection equipment,
- system and equipment maintenance,
- monthly inspections,
- annual inspections,
- firefighting demonstrations,
- housekeeping practices, and
- training.

Fire Suppression

The fire protection system will be designed to protect personnel, limit property loss, and reduce Project downtime in the event of a fire. The fire protection system is summarized in Section 3.0, Project Description and Location. The complete fire protection system includes automatic detection and suppression systems. Transformer protection will be provided by separation and fire walls.

The firewater supply and pumping system will provide an adequate quantity of fire fighting water to yard hydrants, hose stations, and fire sprinkler systems. The system will be capable of supplying maximum water demand for any fire protection requirements as per applicable LORS.

The Solar One Project firewater system source will be comprised of a 40-foot diameter by 20-foot high demineralized water storage tank, diesel fire pump, yard hydrants, fire risers, and fire sprinkler system within the buildings. The demineralized water storage tank will contain approximately 175,000 gallons of demineralized water, and will be a combined-use storage tank for both fire protection water and SunCatcher mirror washing water.

The demineralized water storage tank will be supplied from the demineralized water treatment system housed in the water treatment building next to the tank. Water will be supplied to the water treatment system from a second 175,000-gallon raw water storage tank. The raw water will be supplied from groundwater via an on-site well located to the northeast of the Main Services Complex.

The demineralized water storage tank will be sized to store the minimum requirement for domestic water, fire suppression water for the buildings, and storage capacity for SunCatcher mirror washing. The storage tank piping design will prevent the mirror-washing truck-filling operation to draw the water in the storage tank to a level below the minimum requirement for the Project's fire suppression water system. The diesel-driven fire pump and controller will be interfaced with the building's fire alarm and fire sprinkler systems to run upon fire detection and water flow. An electric-driven firewater jockey pump will maintain water pressure in the fire sprinkler system within the Project facilities and support areas. The diesel-driven pump will start automatically if the pressure in the firewater loop drops below a lower set point. Automatic valves will open to draw water from the demineralized water storage tank if pressure falls below a lower set point. The fire pump will run until manually stopped. Fire pump installation will be in accordance with NFPA 20.

The fixed fire protection system for the Project will be a traditional wet system design that provides coverage and protection within the occupied facilities and the surrounding outside non-occupied support areas. The water treatment, administration, maintenance, and assembly buildings will be provided with a fire sprinkler system design that includes fire risers with the required fire inspection and testing valves, instrumentation, and monitoring. The fire sprinkler system design will be consistent with the construction of Uniform Building Code/International Building Code Type II-N facilities and applicable LORS.

Automatic fire suppression systems will be provided in the control rooms and electrical equipment rooms.

The non-occupied support areas, including the vehicle fueling station, will be provided with a standpipe and hose fire protection design. The hydrogen k-bottle storage area may be provided with a permanent wet fire sprinkler system design that is consistent with the design of the hydrogen gas storage facilities.

Permanently installed fire alarm detection systems will be provided and designed in accordance with the National Electrical Code 70 and NFPA 72. Pull stations will be provided as well as audible and visible annunciation throughout the Project facilities in a zone addressable system with the main monitoring consoles located in the Project control rooms. Heat and smoke detectors will also be designed in the zone addressable system. A pre-action fire suppression control system will be provided for the control rooms and related information technology equipment support areas.

The Project on-site fire suppression systems will be backed up by fire suppression support from the Newberry Springs Fire Department and the San Bernardino County Fire Department (SBCFD). The San Bernardino County Fire Department has an estimated response time of 40 minutes and will provide primary fire protection, fire fighting, and emergency response services to the Project Site. The San Bernardino County Fire Chief will perform a final fire safety inspection on completion of the construction and thereafter will conduct periodic fire safety inspections and training to Solar One Project employees. Before start-up, the San Bernardino County Fire Department will be requested to visit the Project Site to become familiar with the site and with Project emergency response procedures.

Portable and fixed fire suppression equipment and systems will be included in the Project. Portable fire extinguishers will be located at strategic locations throughout the Project Site. The fixed fire protection system will also include a wet, water-based sprinkler fire suppression system for the buildings.

Employees will be given fire safety training, including instruction in fire prevention, the use of portable fire extinguishers and hose stations, and the reporting of fires to the local fire department. Employees will only suppress fires in their incipient stage. Fire drills will be conducted at least twice each year for each work area.

From an overall perspective, there are no significant unavoidable adverse effects to worker safety anticipated from the Project.

5.17.3 Mitigation Measures

No environmental consequences related to worker safety are foreseen at this time; therefore, additional measures beyond those herein are not considered necessary. Additional measures may be necessary should the Project change in a manner that affects worker safety.

5.17.4 Compliance with LORS

The following LORS are applicable or potentially applicable to the Project in the context of the public and occupational safety and health protection measures addressed in this section and in Section 5.16, Public Health and Safety. The LORS applicable to worker safety are summarized in Table 5.17-5, Summary of LORS – Worker Safety. The Project will comply with all LORS related to Worker Safety.

Table 5.17-5
Summary of LORS – Worker Safety

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal Jurisdiction				
Occupational Health and Safety Act of 1970 (OSHA), 29 USC 651 *et seq.*; 29 CFR 1910 *et seq.*; and 29 CFR 1926 *et seq*.	Meet employee health and safety standards for general industry and the construction industry.	Section 5.17.4.1	DIR DOSH	Public Information 415-703-5070 DOSH Consultation Services 800-963-9424

Table 5.17-5
Summary of LORS – Worker Safety

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Department of Labor, Safety and Health Regulations for Construction Promulgated Under Section 333 of the Contract Work Hours and Safety Standards Act, 40 USC 327 *et seq*.	Meet employee health and safety standards for construction activities. Requirements addressed by CCR Title 8, General Construction Safety Orders.	Section 5.17.4.1	DIR DOSH	Public Information 415-703-5070 DOSH Consultation Services 800-963-9424
National Fire Protection Association	Meet standards necessary to establish a reasonable level of safety and property protection from the hazards created by fire and explosion.	Section 5.17.4.1	San Bernardino County Fire Department	Fire Chief Patrick A. Dennen, 909-387-5948
State Jurisdiction				
California Code of Regulations, Title 8	Meet requirements for a safe and hazard-free working environment. Categories of requirements include General Industry Safety Orders, General Construction Safety Orders, and Electrical Safety Orders.	Section 5.17.4.2	DIR DOSH	Public Information 415-703-5070 DOSH Consultation Services 800-963-9424
California Clean Air Act, California Health & Safety Code 39650 *et seq*.	Meet requirements for best available control technology to minimize exposure limits to toxic air pollutants and possible risk assessments for carcinogen pollutants.	Section 5.17.4.2	Mojave Dessert AQMD	General Information 760- 245-1661
California Public Resources §25523(a); 20 CCR §1752, 1752.5, 2300.2309, and Division 2, Chapter 5, Article 1, Appendix B, Part (I), CEC	Protect environmental quality and ensure public health.	Section 5.17.4.2	San Bernardino County Department of Public Works	909-387-7906
California Health and Safety Code §25500 to 25541; 19 CCR §§2720-2734	Estimate emissions for listed air toxic pollutants and submit inventory to air district for major sources of criteria air pollutants. Follow-up from air district may require a health risk assessment.	Section 5.17.4.2	Mojave Dessert AQMD	General Information 760- 245-1661

Table 5.17-5
Summary of LORS – Worker Safety

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Local Jurisdiction				
County of Imperial Zoning Ordinance	Provide safety setbacks as required by the San Bernardino.	Section 5.17.4.3	San Bernardino County Department of Public Works	909-387-7906
DTSC San Bernardino County CUPA	Provide implementation of the Hazardous Materials Business Plan and Risk Management Plan	Section 5.17.4.3	San Bernardino County Fire Department CUPA Office	909-386-8401

Source: California Department of Industrial Relations, 2008; Mojave Dessert AQMD, 2008; San Bernardino County Department of Public Works, 2008; San Bernardino County Fire Department, 2008.
Notes:
AQMD = Air Quality Management District
CCR = California Code of Regulations
CEC = California Energy Commission
CFR = Code of Federal Regulations
CUPA = Certified Unified Program Agency
DIR = Department of Industrial Relations
DOSH = Division of Occupational Safety and Health
DTSC = Department of Toxic Substances Control
LORS = laws, ordinances, regulations, and standards

5.17.4.1 Federal

Occupational Safety and Health Act of 1970 (OSHA), 29 USC 651 et seq.; 29 CFR 1910 et seq.; and 29 CFR 1926 et seq.

The authority establishes occupational safety and health standards (§1910) (i.e., permissible exposure limits for toxic air contaminants [§1910.100], electrical protective equipment requirements [§1910.137], electrical workers safety standards [§1910.269], the requirement that information concerning the hazards associated with the use of all chemicals is transmitted from employers to employees [§1910.1200]), and the safety and health regulations for construction (§1926). Subpart I of Section 1910 and Subpart E of Section 1926 address PPE.

Under the Operational Status Agreement of 5 October 1989 between the federal OSHA and the California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH or Cal-OSHA), the state resumed full enforcement responsibility for most of the relevant federal standards and regulations (55 Federal Register 18610 [12 July 1990]; 29 CFR 1952.172). Federal OSHA has retained concurrent enforcement jurisdiction with respect to certain federal standards including standards relating to hazardous materials at 29 CFR 1910.120 (Id.).

The administering agencies for the above authority are OSHA and DOSH (or Cal-OSHA).

Department of Labor, Safety and Health Regulations for Construction Promulgated Under Section 333 of the Contract Work Hours and Safety Standards Act, 40 USC 327 et seq.

The code establishes safety and health regulations for construction. The requirements for this regulation are all addressed in Title 8 California Code of Regulations, Chapter 4, Subchapter 4, General Construction Safety Orders.

The administering agencies for the above authority are OSHA and DOSH (or Cal-OSHA).

Uniform Fire Code, Article 80

The article includes provisions for storage and handling of hazardous materials. Considerable overlap exists between this code and Chapter 6.95 of the Health and Safety Code. However, the fire code does contain independent provisions regarding fire protection and neutralization systems for emergency venting (§80.303, D, Compressed Gases). Other articles that may be applicable include Article 4, Permits, and Article 79, Flammable and Combustible Liquids.

The administering agency for the above authority is the SBCFD.

National Fire Protection Association

The NFPA prescribes minimum requirements necessary to establish a reasonable level of fire safety and property protection from the hazards created by fire and explosion. The standards apply to the manufacture, testing, and maintenance of equipment.

The administering agency for the above authority is the SBCFD.

Compliance

The Solar One Project will comply with all federal LORS by developing appropriate plans and policies as well as by measures described in Section 5.17.2, Environmental Consequences, and Section 5.17.3, Mitigation Measures.

5.17.4.2 State

8 California Code of Regulations

These authorities prescribe general occupational safety and health regulations and standards in addition to the construction and industrial safety regulations, standards, and orders. The Solar One Project will comply with applicable sections of 8 CCR, Chapter 4, Subchapter 7, and 24 CCR. Topics of concern are provided in 8 CCR 1509 (Construction) and 3203 (General Industry). These regulations make numerous changes designed to redirect the emphasis of Cal-OSHA toward ensuring that employers have an effective work site IIPP to focus Cal-OSHA discretionary inspections in the highest hazard industries, as determined by worker compensation and other occupational injury data, and to limit the number of follow-up inspections that Cal-OSHA must perform. 8 CCR 5189 requires facility owners to develop and implement effective safety management plans to ensure that large quantities of hazardous materials are handled safely. Although such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Health and Safety Code, Section 25500

This code requires companies that handle hazardous materials in sufficient quantities to develop a Hazardous Materials Business Plan (HMBP). The HMBP includes the basic information on the location, type, quantity, and health risks of hazardous materials handled, stored, used, or disposed of that could be accidentally released into the environment. The HMBP also includes a plan for training new personnel and for annual training of all personnel in safety procedures to follow in the event of a release of hazardous materials. In addition, the HMBP includes an emergency response plan and identifies the business representative able to assist emergency personnel in the event of a release.

The California Health and Safety Code, Section 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop a RMP and submit it to appropriate local authorities, the Environmental Protection Agency, and the designated local administering agency for review and approval. The RMP includes an evaluation of the potential effects associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any pre-existing evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This newly developed program supersedes the California RMP and is known as the California Accidental Release Program.

Compliance

The Solar One Project will comply with all state LORS by developing appropriate plans and policies as well as by the measures described in Section 5.17.2, Environmental Consequences, and Section 5.17.3, Mitigation Measures.

5.17.4.3 Local

San Bernardino County Fire Department, Certified Unified Program Agency Office

This office provides for the implementation of the HMBP and the RMP.

Compliance

The Solar One Project will comply with all local LORS, will develop an HMBP for construction and operation of the Project Site, and will develop an RMP for operation of the Project. The Solar One Project will also ensure continued compliance by updating the appropriate plans and policies as well as by the measures described in Section 5.17.2, Environmental Consequences, and Section 5.17.3, Mitigation Measures.

5.17.4.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to worker safety are shown in Table 5.17-6, Agency Contact List for LORS.

Table 5.17-6
Agency Contact List for LORS

Agency	Contact	Address	Telephone
San Bernardino County Fire Department CUPA Office	Doug Synder Deputy Fire Marshall	620 South "E" Street San Bernardino, CA 92415	909-386-8401

Source: San Bernardino County Fire Department, 2008.
Notes: CUPA = Certified Unified Program Agency

5.17.4.5 Applicable Permits

The permits required for this Project are listed in Table 5.17-7, Applicable Permits. An HMBP will be developed before Project construction and will be updated before Project operation.

Table 5.17-7
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local – San Bernardino County Fire Department CUPA	Hazardous Materials Business Plan	30 days before storage of hazardous materials on-site
Local – San Bernardino County Fire Department CUPA	Risk Management Plan	Before delivery of hydrogen to the Project Site

Source: San Bernardino County Fire Department, 2008.
Notes:
CUPA = Certified Unified Program Agency
N/A = not applicable

5.17.5 References

American Conference of Governmental Industrial Hygienists. 1996. Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices.

CCR (California Code of Regulations). No date. Title 8. "General Industry Safety Orders, Construction Safety Orders, and High Voltage Electrical Safety Orders."

California Department of Industrial Relations. 2008. Information downloaded from http://www.dir.ca.gov/occupational_safety.html.

County of San Bernardino Department of Public Works. 2008. Information downloaded from http://www.sbcounty.gov/dpw/contactus/default.asp. October.

County of San Bernardino Fire Department. 2008. Information downloaded from http://www.sbcfire.org/phone_directory.asp. October.

CFR (Code of Federal Regulations). No date. Title 29 Part 1910. "Construction Safety Orders".

———. No date. Title 29 Part 1926. "General Industry Safety Orders".

DTSC (California Department of Toxic Substances Control) San Bernardino County CUPA (Certified Unified Program Agency). 2008. Information downloaded from http:\www.calcupa.net.

Mojave Dessert AQMD. 2008. Information downloaded from http://www.arb.ca.gov/drdb/dismap.htm. October.

NFPA (National Fire Protection Association). 1994. *A Compilation of NFPA Codes, Standards, Recommended Practices and Guides.* Quincy, Massachusetts.

National Safety Council. 1992. Accident Prevention Manual. Volume 2, Chapter 6, Fire Protection, pp. 1324-1386.

SES Solar Three, LLC and SES Solar Six, LLC. 2008. *Project Description and Plan of Development*.

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Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**	Revision No.	0	Date	

Technical Area:	**Worker Safety**	Project:	SES Solar One	Technical Staff:	
Project Manager:		Docket:		Technical Senior:	

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the Project, the measures proposed to mitigate adverse environmental impacts of the Project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.17.1 Section 5.17.2.1 Section 5.17.2.2 Section 5.17.3		
Appendix B (g) (11) (A)	A description of the safety training programs which will be required for construction and operation personnel.	Section 5.17.2.1 Section 5.17.2.2		
Appendix B (g) (11) (B)	A complete description of the fuel handling system and the fire suppression system.	Section 5.17.2.2		

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**	Revision No.	0	Date	

Technical Area:	**Worker Safety**	Project:	SES Solar One	Technical Staff:	
Project Manager:		Docket:		Technical Senior:	

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (g) (11) (C)	Provide draft outlines of the Construction Health and Safety Program and the Operation Health and Safety Program, as follows:	Section 5.17.2.1 Section 5.17.2.2		
	Construction Health and Safety Program: * Injury and Illness Prevention Plan (8 Cal. Code Regs., § 1509);	Section 5.17.2.1		
	* Fire Protection and Prevention Plan (8 Cal. Code Regs., § 1920);	Section 5.17.2.1 Section 5.17.2.2		
	* Personal Protective Equipment Program (8 Cal. Code Regs., §§ 1514-1522)	Section 5.17.2.1 Section 5.17.2.2		
	Operation Health and Safety Program: * Injury and Illness Prevention Program (8 Cal. Code Regs., § 3203);	Section 5.17.2.1 Section 5.17.2.2		
	* Fire Prevention Plan (8 Cal. Code Regs., § 3221);	Section 5.17.2.1 Section 5.17.2.2		
	* Emergency Action Plan (8 Cal. Code Regs., § 3220);	Section 5.17.2.1 Section 5.17.2.2 Table 5.17-4		
	Personal Protective Equipment Program (8 Cal. Code Regs., §§ 3401-3411).	Section 5.17.2.1 Section 5.17.2.2		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed Project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.17.4 Table 5.17-5		

Adequacy Issue:	Adequate		Inadequate		**DATA ADEQUACY WORKSHEET**	Revision No.	0	Date	

Technical Area:	**Worker Safety**	Project:	SES Solar One	Technical Staff:	
Project Manager:		Docket:		Technical Senior:	

SITING REGULATIONS	**INFORMATION**	**AFC SECTION NUMBER**	**ADEQUATE YES OR NO**	**INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS**
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.17.4 Table 5.17-5		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 5.17.4.4 Table 5.17-6		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.17.4.5 Table 5.17-7		

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